

ABSTRACT OF THE DISCLOSURE

A pattern detection method and apparatus thereof for inspecting with high resolution a micro fine defect of a pattern on an inspected object and a semiconductor substrate manufacturing method and system for manufacturing semiconductor substrates such as semiconductor wafers with a high yield. A micro fine pattern on the inspected object is inspected by irradiating an annular-looped illumination through an objective lens onto a wafer mounted on a stage, the wafer having micro fine patterns thereon. The illumination light may be circularly or elliptically polarized and controlled according to an image detected on the pupil of the objective lens and image signals are obtained by detecting a reflected light from the wafer. The image signals are compared with reference image signals and a part of the pattern showing inconsistency is detected as a defect so that simultaneously, a micro fine defect or defects on the micro fine pattern are detected with high resolution. Further, process conditions of a manufacturing line are controlled by analyzing a cause of defect and a factor of defect which occurs on the pattern.